

II. *The Life History of Clythra quadri-punctata*, L. By  
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PLATE III.

It is my intention to lay before you in this short paper an outline of the complete life history of *Clythra quadri-punctata*. A certain amount has been written upon the subject, but such writings are scattered and fragmentary, and in none is there a complete account of the creature's life history, nor has even what was known been connected together. I hope to fill up this blank in the life history of one of our common beetles. I have had all the stages under my close observation during the last two years, and have endeavoured not only to test and connect together what has been done already, but to find out and prove those facts which were unknown heretofore.

I give at the end of my paper a short sketch of what has been written before.

The two most important points which still required elucidating were how the larva gets into the ants' nest in which it is found, and on what it lives when there.

I commence my account of the life history from the point at which I myself began to study it, and this consisted of the larvæ and the larval cases taken from the ants' nests.

Now to carry on any experiments in this matter successfully, two things are necessary—a good supply of the larva, and a nest of its host, *Formica rufa*, in such a form that it can be under close observation and yet be as natural as possible. In order that much that follows may be understood, it becomes necessary for me to describe how I procured and arranged the latter of these requisites. In April I went to a nest of *Formica rufa* I had noticed at Oxshott. I found the ants "massing" on the hillock in the sun. I took a number of the workers, and about twelve queens, and several handfuls of the *débris* of the nest, and placed them all in a bag. On reaching home I placed the contents of the bag in a wooden box. I had

ready a large glass vessel, the bottom of which I had filled with mould. This vessel stood in a large zinc tray, the outside of which consists of a trough to hold water about an inch and a half wide, and two inches deep. Between the sides of the glass case and the trough there is space about two inches wide. The ants use a corner of this space as a cemetery and "kitchen midden," walking up the glass sides and returning with ease. I connected the vessel with a wooden box containing the ants, by means of a lead pipe. When as many of the ants as I required had passed through this tube into the glass case, I removed it, and placed a couple of handfuls of the *débris* out of the box on to the mould. The ants soon built up a small hillock in one corner of their case, and have steadily added to it ever since, excavating galleries beneath the mould. I have from time to time supplied them with fresh pine-needles, etc., to build with, and for food have given them honey and live insects.

If one digs deep into a nest of *Formica rufa* in the spring, one will generally find a lot of the curious cases made by the larva of *Clythra quadri-punctata*. This case, which is made of black excrementitious matter, is somewhat pear-shaped, and is open at the narrow end, the opening being closed by the hard horny head of the larva. On its upper side several ridges run from the mouth of the case, the inner ones meeting and forming a series of Vs, in order, as it is supposed, to strengthen it. On May 3rd this year I obtained a fair number of cases from a nest of *Formica rufa* at Weybridge, containing larvæ and pupæ. Some of these I proceeded to introduce into my "observation nest" described above. The ants attacked the cases, endeavouring to tear them open with their jaws (which are not however strong enough for this purpose), and squirted acid on to them. The closed cases (containing pupæ) were dragged about for a long time, but eventually most of them were taken into the nest.

When a case containing a larva was attacked, the larva withdrew into its case, blocking up the opening with its horny head. When it got the chance it laid hold of a twig or other object on the nest to prevent the ants dragging it about. When left alone it crawled stealthily along and finally disappeared into the nest. When walking the larva comes out of its case far enough to give free play to the legs, dragging the case after it.

I also removed some larvæ and pupæ from their cases and introduced them into my nest. These were attacked and torn to pieces by the ants. The naked larva is a fat, fleshy grub with a hard, horny head; it is much curved, and its hinder end, which is the largest part, is bent forwards, as in the *Lamellicornia*.

On May 4th I noticed a larva crawling about. I have in my notes, "It appeared to bite at the mould, fir-needles, etc."

On May 13th I introduced from the Blean Woods, where I had taken very many cases of all sizes in the ants' nest there, several pupal and larval cases. The same results were obtained. The ants carried some of them up the sides of the glass case, as if to remove them altogether. All the pupæ were in the end taken into the nest, or into some of the galleries underground; the larvæ entering the nest themselves.

On May 14th a larva was observed walking about, and on the 19th another was seen to come up out of a gallery and crawl about. The ants now paid no attention to it, walking over and by it. On June 16th I noticed an ant carrying a *Clythra* case with a larva in it. It took it out of the nest, and threw it into the water-trough. I put it back, but on the 17th it was again removed. I put it back for the second time, when it went down a gallery and was seen no more.

Having placed *Clythra* cases containing larvæ in small boxes with damp blotting-paper, I gave to some "egg-masses" of *Formica rufa*, to others dead ants and dead beetles, etc., from the nest. They none of them ever touched the "egg-masses" or any other animal matter supplied to them. They however sucked the wet blotting-paper. The largest larvæ (full-grown) closed their cases and pupated, but the smaller ones lived for months without growing, and in the end died. I placed others in boxes with mould and twigs, etc., from the nest. They appeared to bite at the refuse. Finally, to settle this question of food, I sent some full-grown fresh larvæ in spirit to Professor Poulton, who had kindly promised to dissect them for me under the microscope. He tells me he detected pieces of vegetable tissue after careful treatment, and that there is no doubt there was vegetable matter in the digestive tract. I also removed several larvæ from their cases, and put them into small boxes with the same different

sets of materials as the others, and I find that they are quite unable to construct a new case, when once they have been removed from their original one. They excrete small particles of a substance similar to that of which the case is made, but they never make any attempt to build a new case. These larvæ also lived for months; they were of all sizes, but the full-grown larvæ never pupated, and all died in the end.

I left cases in water, alcohol, benzine, methylated spirit, vinegar, sulphuric acid, etc., in all of which they are insoluble. The only thing in which they appear to be soluble is caustic potash. Furthermore I sent empty cases to Professor Poulton to experiment with. He kindly reports as follows: "Heated in the blue flame of a Bunsen burner, the cases first gave off a smoke and then burnt with a bright flame. This was probably the decomposition and removal of some cement substance and colouring matter secreted by the larva. Keeping the case at incandescence for some minutes, there remained a pale reddish-brown cast, exactly similar to the original case. It was friable, and easily ground to powder by pressure. This powder, examined in a drop of water under the microscope, was seen to consist of transparent crystalline masses of very variable size and irregular outline. They were unaffected by strong hydrochloric acid, and are probably minute fragments of quartz. The cases are probably made of an earth chiefly composed of a quartz sand, and cemented together by some secretion of the larvæ's. The reddish tint was probably caused by sesquioxide of iron, derived from iron in the earth made use of." These experiments confirm the fact that the larva constructs its case of earth, mixed with its excrement as a cement. We can see the importance of the cases being insoluble in acid since the ants squirt formic acid on to them.

Fabre says, speaking of species of *Cryptocephalus* and *Clythra*, that they enlarge the case by removing the old material from within, and plastering it on the outside, and that they construct the case with their excrement mixed with earthy material, using only the mandibles for the purpose. It is stated that when the larva changes its skin it first fastens its case to a piece of wood or other object in the nest. I have found that some of the larvæ in my nest fastened themselves to a small piece of wood for a day or two (when I thought they were going to pupate),

and then moved away again. To pupate, the larva, after closing the open end, or fastening it to something in the nest, turns round and faces the bottom of the case. The beetle emerges by cutting round the inside of the case in a circle with its mandibles, thus forming a cap, which it forces off.

We now come to my experiments with the perfect insect. On May 13th I introduced into my nest a beetle, which had hatched out from a case taken from a *Formica rufa* nest in the Blean Woods. It was attacked by the ants, dragged about, and later on thrown out of the nest half dead.

On May 16th a *Clythra* had emerged from the pupa-case in my nest; three ants were dragging about the empty case, and another the beetle, which remained quite motionless. From this date onwards many of the beetles kept emerging, both in my boxes and in my nest itself.

On May 18th a dead *Clythra* was removed from the nest by the ants; it had a hole bitten in its abdomen.

I find that when a *Clythra* emerges in the nest, it proceeds very cautiously to get away: remains quite motionless when attacked, "feigning death," and holding on to twigs etc.; when left alone it continues to walk again, and is generally successful in making good its escape.

Now it seemed to me that, as the beetle is so liable to be attacked by the ants, it would be very dangerous for the female, at such a critical time in the life history as the egg-laying, to return to the nest to deposit her eggs. The next question to settle therefore was how the larvæ got into the nest. In nature one finds the beetles flying round and settling on birch and other shrubs in districts where *Formica rufa* abounds. I placed some branches of birch in a jar of water in a large breeding-cage, and introduced all my beetles into it. They flew about in the sun, and very soon many couples were in copulation.

In copulation the ♂ sits far back on the ♀, all three pairs of tarsi resting on her elytra, the anterior pair just below the scutellum, intermediate pair on about the centre of each elytron, and the posterior pair two-thirds from the base of the elytra. The claws do not clasp hold, the tarsi holding on as if they were "suckers." The penis is fairly long and broad at the end, being somewhat spade-shaped. Copulation appears to take place many times, the same female being served by several males. I tried introducing couples in copulation on birch twigs into my nest;



they were, however, generally disturbed by the ants, when they separated and flew out of the nest. When not disturbed they separated in about twenty-five minutes, and then both flew away.

Last year I had eggs laid by these beetles, in boxes in which I had kept them. Nearly all the eggs were naked, but two of them were partly covered by a curious case. I sent them to Dr. Chapman to describe, as I was going away at the time; this he kindly did in the *Entomological Record* (for 1900, p. 213), as follows.

Of the naked eggs he says they were: "Long ovoid, apparently circular in cross-section. The length is .12 m.m., the greatest width .56 m.m. The colour is yellowish-white, somewhat opalescent, with clearer and more transparent contents towards the ends in some specimens."

Of the partly-covered eggs he writes: "When magnified so as to look an inch or two long, one cannot resist the idea that here is a larval case, or cocoon, clothed with the brown glumes, or bracts, that fall from the leaf-buds of trees when they open in the spring. The bracts are thin and membranous, projecting in various directions. . . but unlike bracts, are not all to regular pattern, and are like irregular torn pieces of membrane, of various sizes and shapes. Their total projection is .12 m.m. from the surface of the egg." He then asked if I could explain how this covering to the egg was provided, and what was its use. I suggested (*Entomologists' Record*, 1900, p. 238), that perhaps the beetles laid the eggs on, or in, the anthill, and that all the eggs were then supplied with capsules to serve the young larvæ as a protection till they had formed their own cases. Now let us return to the breeding-cage. I found that the beetles ate the leaves, and especially the young shoots of the birch, biting them through at the top.

On June 16th I found on the floor of the cage both covered and naked eggs, but in the case of the covered eggs they were now completely enveloped by such a capsule as that described by Dr. Chapman. They look exactly like the bract, or some other part, of a plant, and in fact are very like the end of a birch catkin when it breaks off. Without food the beetle does not appear to be able to construct a proper covering to the egg. This egg-case is made by the ♀ beetle from her own excrement. It is a lengthy process, which I was fortunate enough to observe on several occasions. The ♀ clasps a branch with

the anterior pair of legs, the body being held well away from it. The egg, which was held in the depression of the abdomen, is covered with excrement, which is smoothed, patted and arranged into the required shape by the posterior tarsi. When finished the egg is dropped. I obtained altogether a number of these covered eggs, as well as some naked ones, but they were always dropped to the ground. The ♀ does not appear to lay continuously, but to drop the eggs at intervals.

As Father Wasman records finding specimens at Exaeten, in Holland, "*die zur Eiablage die Nester besuchten*," I wrote and asked him if he had ever seen the ♀ laying. He replied as follows: "I have not seen the ♀ ♀ entering the nests, nor have I seen the act of oviposition. But I have found them sitting over the nest—for example, on grass stems overmounting the nests. I have also several times seen *Clythra*, freshly developed, attacked by the ants; they 'feigned death,' contracted their legs, and are probably protected also by their distasteful blood (the same as in *Timarcha*, whose secretion seems to be a means of defence, especially for many *Chrysomelidæ*). Relics of *Clythra* devoured by the ants I have even found in the nests." These remarks confirm my own observations. I may here record the experiments I carried out to prove the distastefulness, or otherwise, of this beetle. On June 9th I took a number of specimens of *Clythra quadri-punctata* to the Zoological Gardens, and offered them to the following creatures with the results recorded.

A white-backed trumpeter ate a *Clythra*, but it was evidently distasteful to it, and it refused to touch another. The other birds of the same species refused to eat any at all.

Some wood-swallows, after much pecking at and rejecting the beetles, eventually ate them; the keeper however said the birds were hungry, and the beetles were evidently not to their taste.

The lapwing pecked at *Clythra*, but eventually refused it, rubbing the beetle into the ground with its feet. It then went and washed its bill in some water.

The snow-bunting and house-sparrow both pecked at and killed *Clythra*, but refused to eat it.

The racket-tailed drongo was the only creature that ate *Clythra* readily, but this bird appears to eat anything that is given to it.

The marmosette took a *Clythra* from its keeper, and put

it into its mouth, but immediately took it out again, and threw it down in evident disgust. It would have nothing more to do with the beetles.

Finally my three species of lizards (*Lacerta viridis*, *Lacerta muralis* v. *tiligurta*, and *Lacerta agilis*) would never touch *Clythra*.

In the *Entomologists' Record* (for 1900, p. 174) I stated that I considered *Clythra quadri-punctata* to be a mimic of the lady-bird, *Coccinella distincta*, which also lives in nests of *Formica rufa*; and in my paper on "Cases of Protective Resemblance, Mimicry, etc.," in our Transactions (Trans. Ent. Soc. Lond. 1901, part iii, p. 367), I suggested that *Clythra* might be distasteful on its own account, and thus provide an example of Müllerian mimicry. This we now see is the case.

To return to the covered eggs. We have seen that the ♀ beetle sits on a branch above, or near, a nest of *Formica rufa* and lets fall the egg. I therefore dropped and placed eggs into the case which contained my nest. They were always removed by the ants and taken into the nest. On June 23rd I placed a covered egg near my nest which I watched for some time. I have written in my note-book: "At 5.30 an ant took up the covered egg, and carried it into a gallery, returning immediately without it."

My experiments therefore have established this new and interesting point—that the ants carry the egg in its case into the nest. In carrying the egg into the nest, the ant may be under the impression that she has a bit of vegetable matter that will be useful in the nest, as other vegetable remains are; or she may think she has something different, but still a useful and normal addition to the nest. It seems highly probable that, were the beetle a pernicious and parasitic addition to the nest, the ants would ere this have learned to discriminate the egg as something undesirable. That she does take it in, under whichever of the impressions we have suggested, leads to the belief that the beetle is an inhabitant of the nest that is useful to the ants. In what way, we probably have no material for a conclusive opinion. It may be that its food is that portion of the vegetable material of the nest which has served its purpose to the ants, and which by incipient (or completed) decay is liable to be a danger to the community, or at least to clog the highways.

I kept some of the covered eggs in boxes, and bred some



of the young larvæ, which hatched in about twenty-one days. Dr. Chapman thus described a newly-hatched larva he bred from one of the eggs I sent to him last year: "The larva is very like a miniature cockchafer-grub in having the abdominal segments acutely bent forwards. The head is large, the antennæ short and stumpy, of two joints, the first so thick, and the second so square, at the end as to look like the two basal joints of a lepidopterous antennæ with the remainder broken off. The mouth-parts are well seen. The legs are very long, more than half the length of the body; the coxæ, femora, and tibiæ being very long; the tarsi are represented by a good claw only, which is however not a claw, but a joint, as it carries a hair or two."

When I before referred to the cases I took in the Blean Woods, I mentioned that I got them of all sizes. On the smallest cases I observed that the closed end was of a different material to the rest of the case; this on examination with the microscope turned out to be an egg-case. It is therefore evident that the egg-case fulfils several very important functions. First, to deceive the ants as to its real nature, and induce them to pick it up and take it into their nest, as they will any small vegetable substance, etc.; then, not only to protect the young larva from the ants, but to give it a foundation on which to commence the building of the larval case.

Fabre says that the egg-case (speaking of species of *Clythra* and *Cryptocephalus*) is covered over by the larval case, and may sometimes be found incrusting in it. This is not however my experience with *Clythra quadri-punctata*. I have found larval cases which were a little bigger than those just described, in which the egg-case had broken off, leaving a small hole. The hole is not large enough to be of any danger to the larva, and is soon filled up with the same material as the rest of the case.

To recapitulate the foregoing facts: The life history of *Clythra quadri-punctata* is briefly as follows. When the beetle has emerged from the pupa in the nest, it escapes with caution, "feigning death," and holding on to twigs, when attacked by the ants. It then seeks its mate, and copulation takes place. The beetles are generally to be found on birch shrubs, the young shoots and leaves of which they eat, biting the top shoots right through. The ♀ then seeks a tree or shrub above or close to a nest of *Formica rufa*, and

drops the eggs on to the ground beneath. The eggs are covered by a case, or capsule, which is placed around it by the ♀, and consists of her own excrement. This covering is placed in position with the posterior tarsi, the egg being held in the depression of the abdomen. The covered egg looks exactly like a small bract, and is exceedingly like the end of a birch catkin. The ants pick up the covered egg and carry it into the nest. The young larva, which hatches in about twenty-one days, uses the egg-case as a nucleus on which to build the larval case; thus very young larval cases have the egg-case still attached to their posterior end. The egg-case has a threefold *raison d'être*—to protect the egg and newly-hatched larva, to make the ants believe it is a bit of useful vegetable refuse, and to give the larva a foundation on which to start the larval case. When the larval case grows larger, the egg-case breaks off, and the larva fills up the hole thus formed with the same material as that with which it builds the rest of the case. This material consists of its own excrement mixed with earth, which it prepares with its mandibles. To enlarge the case the larva removes particles from the inside, and plasters them on to the outside. The larva feeds on vegetable refuse in the nest. When changing its skin it fastens the case to some object in the nest. When full-grown it fastens the case to a piece of wood or twig, and turning completely round, changes to a pupa, facing the broader end of the case. When hatched the beetle gets out of the case at this broader end, by biting a circle round inside it, thus forming a cap, which it forces off.

I now give as much of the bibliography as I have been able to find on the subject.

Schaller (Abhand. der Hall. Naturf. Gesellschaft, Bd. i, p. 328, 1783) points out that it is not only the larvæ of Lepidoptera and Neuroptera that make cases, but also coleopterous ones; and that a whole family of *Chrysomelidæ* have this habit. He then records having found ten cases containing larvæ under a stone; these cases and the larvæ he describes, and figures the former. He says, to pupate the larva turns round and faces the other end of its case. He mentions that *Chrysomela quadri-punctata* emerged from these cases, and that the food of the larvæ must be very different to that of the perfect insect.

Gené (Ann. des Sc. Natur., xx, pp. 143–156, 1830) relates

that the larvæ of *Clythra* and *Cryptocephalus* live in cylindrical tubes which they drag about with them. He describes the larva and case of a *Clythra*, explaining that the case is made of the excrement of the larvæ, which they place on with their mandibles. He mentions that the larva turns round in the case to pupate, and the beetle emerges through the broad end. He also points out that the ♀ covers the egg with her excrement.

A. Chevrolat (Revue Ent. Silbermann, iii, p. 265, 1835) records again finding in the centre of an ants' nest an isolated larva (coleopterous) which resembled that of *Clythra*. He describes this case, which he says is made of glutinous earth mixed with little stones, one end being closed by the head of the larva, which was smooth, black, and scaly.

Dr. Schmidt (Stet. Ent. Ztg., 1841, pp. 146-151), in a paper on *Clythra quadri-punctata* and its nearest allies, refers to Schaller's observations on the larvæ, mentioning that he has also had the opportunity to study them.

Maerkel (German. Zeitschr. f. Ent., iii, p. 221, 1841) describes the larval case of *Clythra quadrisignata*, many of which he had found in ants' nests. He mentions that the larva fastened up the open end of the case before pupation, and that the beetle came out at the other end. He then suggests that perhaps the larva of *Clythra quadri-punctata* does not live with ants.

Rosenhauer (Stet. Ent. Ztg., 1842, p. 50) records finding a *Clythra* case in a nest of *Formica rufa*, from which *Clythra 4-punctata* hatched out. He describes the case and larva, and says it must now be found out how the case is made, and what the larva feeds on.

Maerkel (German. Zeitschr. f. Ent., v, p. 254, 1844) states that according to Rosenhauer the larva of *Clythra quadri-punctata* lives in the nest of *Formica rufa*.

Lacordaire (Monog. des Coleopt. sub. de la Form. des Phytogapha, t. ii, p. 13, 1848) describes the larvæ, larval cases and egg-cases of *Clythra*. He states that the larval case is made of excrement, and not, as supposed heretofore, of earth. He mentions that the ♀ encloses the egg with her excrement. He suggests that when the larval case is closed, it is as a protection against the cold, and states that the larval case of *Clythra 4-punctata* has up to now only been found with *Formica rufa*.

Vallot (Revue Zoolog., ix, p. 180, 1848) describes *Clythra*

cases found in ants' nests, mentioning that the larva closes the case and turns round to pupate. He points out that what they feed on, and why they occur in ants' nests, is not known.

Rosenhauer (Ueber die Entro. und Fortpf. der *Clythra* and *Cryptocephalus*, 1852) describes the larva, pupa, larval case, and egg-case of *Clythra quadri-punctata*. He says the case is made of excrement, although the earlier writers have said it is made of earth. He points out that the larva of *Clythra quadri-punctata* is only found with *Formica rufa*. He records having found a closed case in the autumn, and suggests that the larva closes the case against the cold, as do snails. He found that the larva would not eat leaves or dead ants, but that it ate a meal-worm, and he expects they feed on the prey of the ants, but that it is very desirable that their real food should be found out. Speaking of species of *Clythra* and *Cryptocephalus*, he describes how the ♀ covers the egg which she drops, or throws away from her. He further states that when naked eggs occur, they are dropped by the ♀ against her will, or that she has not had food.

Chapuis et Candèze (Catalogue des Larves des Coleopt., p. 278, 1853) describe and figure the larva and larval case of *Clythra quadri-punctata*. They mention that the ♀ covers the egg with excrement, and that the larva enlarges the case by adding bits to it. They state that when it changes its skin, the larva first fastens up the end of the case.

Gabriel Tappes (L'Abeille, vol. iv, p. lxxxii) points out that the ♀♀ of *Cryptocephalus* have a small cavity on the last segments of the abdomen, and that they hold the egg in this cavity when, like *Clythra*, they cover it with excrement. He then describes how the ♀ carries out this operation, making the finished article look like buds or catkins. He mentions that the larva constructs another case, and that the first falls off, leaving only a slight trace at its lower end. He states that the larva is generally found in ants' nests, where it devours the twigs and bits of dried leaves collected by the ants. He also points out that the larval case is a protection against the ants. He mentions that the larva plasters on its case its excrement, which is seized by the legs, and that to pupate it closes the case and turns round. He says that to emerge the beetle cuts a cap off the bottom of the case.

F. Buchanan White (Scot. Nat., vol. i, p. 261, 1871) describes the larval case of *Clythra quadri-punctata*, which he says is of black excrementitious matter, and is constructed by the larva to protect itself from the ants. He also states that the larvæ (which he records as common in Scotland in the nests of *Formica rufa*) feed on the spongy material which forms the older part of the ant-hill, but he does not tell us on what grounds he makes this statement. He mentions that the larva fastens its case to a twig or other object in the nest to pupate, turning round and facing the bottom of the case.

Collett (Ent. Mo. Mag., xx, p. 40, 1883) records finding *Clythra quadri-punctata* in numbers near Hastings. They were flying in the sunshine around nests of *Formica rufa*, or sitting on bushes overhanging them. On several occasions he saw specimens crawling about with the ants, and once a ♀ emerging from the entrance to the subterranean cells.

Fabre (Souvenirs Entomologiques, Sept. Serre, pp. 235–259), writing on species of *Clythra* and *Cryptocephalus*, describes the larval cases, and says that of *Clythra* is insoluble in water, and fire has not much effect on it. In the flame of a candle it loses its brown colour, and takes on the tint of calcined ferruginous earth; hence the base must be of a mineral nature. He says the larva makes the case by bringing out of the back of it a pellet of excrement, which it kneads with a little earth, and plasters on with its mandibles. To enlarge the case it removes part of the inside and puts it on to the outside. He describes egg and egg-case (figuring the egg-case of *Clythra quadri-punctata*, which is not however very like it). He mentions that the ♀♀ let the eggs fall at intervals promiscuously from the boughs (one species of *Clythra* however fastening them by long filaments to a branch), and that the newly-hatched larva remains in the egg-case and adds to it to form the larval case. He says that the larvæ of *Clythra longipes* fed on bits of dead moistened bark, but that he believes they really ate the lichen and algæ that covered it, and not the bark itself. He makes no mention whatever of their connection with ants.



### EXPLANATION OF PLATE III.

- Fig. 1. The perfect insect.
2. The naked egg.
  3. The covered egg, or egg-case.
  4. The newly-hatched larva.
  5. The full-grown larva.
  6. The pupa.
  7. The very young larval cases with egg-case attached, and after it has broken off.
  8. The full-grown larval case.
  9. Ditto (showing other side) attached to piece of wood.